

CLAIMS

1. A device for reading or writing information, the device comprising:

an electromagnetic transducer including a plurality of solid transducer layers,

a ceramic substrate adjoining said transducer, said substrate shaped as a rigid body adjacent to said transducer and as a plurality of flexible elements distal to said transducer, and

an actuator attached to said substrate distal to said transducer.

2. The device of claim 1, wherein said actuator includes a layer of piezoelectric material.

3. The device of claim 1, wherein:

said actuator includes a layer of piezoelectric material, and

said transducer layers are substantially parallel with said layer of piezoelectric material.

4. The device of claim 1, wherein said actuator includes a plurality of layers of piezoelectric material.

5. The device of claim 1, wherein:

said actuator includes a plurality of layers of piezoelectric material, and

said actuator includes at least three electrically conductive layers each adjoining at least one of said piezoelectric material layers.

6. The device of claim 1, wherein said flexible elements are substantially aligned with a center of mass of said rigid body.

7. The device of claim 1, wherein said rigid body has a media-facing-surface separated from a back surface in a Z-direction, and at least a portion of said flexible elements is disposed at a Z-height between said surfaces.

8. The device of claim 1, wherein said flexible elements are aligned substantially with a plane, and said rigid body and said actuator are intersected by said plane.

9. The device of claim 1, wherein said rigid body has a media-facing-surface separated from a back surface, and said back surface has a protrusion extending away from said media-facing surface.

10. The device of claim 1, wherein at least one of said flexible elements contains a plurality of conductive leads.

11. A device for reading or writing information, the device comprising:

a wafer substrate piece disposed between an electromagnetic transducer and an electrostrictive actuator, said substrate piece shaped as a rigid body adjoining said transducer and as a flexible element connecting said rigid body and said actuator.

12. The device of claim 11, wherein said actuator includes a layer of piezoelectric material.

13. The device of claim 11, wherein:

said actuator includes a layer of piezoelectric material, and

said transducer includes a plurality of layers that are substantially parallel with said layer of piezoelectric material.

14. The device of claim 11, wherein said flexible element includes a plurality of flexible portions aligned substantially with a plane, and said rigid body and said actuator are intersected by said plane.

15. The device of claim 11, wherein said actuator includes a plurality of layers of piezoelectric material interspersed with a plurality of layers of electrically conductive materials.

16. The device of claim 11, wherein:

said actuator includes a plurality of layers of piezoelectric material interspersed with a plurality of layers of electrically conductive materials, and

alternate layers of said layers of electrically conductive materials are interconnected.

17. The device of claim 11, wherein said rigid body has a media-facing-surface separated from a back surface, and said back surface has a protrusion extending away from said media-facing surface.

18. The device of claim 11, wherein said rigid body and said actuator contain a material including silicon.

19. The device of claim 11, wherein said device includes means for providing electrical voltage to said actuator.

20. A device for reading or writing information, the device comprising:

an electromagnetic transducer including a plurality of solid transducer layers,

a ceramic substrate adjoining said transducer, said substrate shaped as a rigid body adjacent to said transducer and as a plurality of flexible elements distal to said transducer, and

actuation means for positioning said transducer,

said actuation means attached to said substrate distal to said transducer.